

CLAIMS

We claim:

1. A method of extracting an audio signal from a mechanical recording having a modulated groove on a surface, wherein said groove is formed by a modulated curvilinear longitudinal profile substantially orthogonal to a plurality of sequential transverse profiles from beginning to end of the groove, said longitudinal profile at each point in the transverse profile substantially tangent to said surface, each transverse section comprising two side surfaces and a bottom surface distanced from said surface, comprising:
 - i) profiling said mechanical recording to form a metrological data set comprising metrological data; and
 - ii) processing said metrological data set by obtaining transverse profiles of said longitudinal profile representative of the modulated groove in three dimensions; and
 - iii) further processing said metrological data set to reconstitute said audio signal defined by variations in the modulation of said modulated groove.
2. The method of claim 1, wherein said providing mechanical recording step further comprises:
 - a) said modulated groove projecting above the surface of a negative medium.
3. The method of claim 1, wherein said providing mechanical recording step further comprises:
 - a) said modulated groove indenting below the surface of a positive medium.
4. The method of claim 1 wherein said profiling step further comprises:
 - a) confocally imaging said modulated groove.
5. The method of claim 4 wherein said confocal imaging is polychromatic confocal imaging.
6. The method of claim 4 wherein said confocal imaging is monochromatic confocal imaging.
7. The method of claim 1 wherein said profiling step further comprises:
 - a) imaging said modulated groove with digital sectioning.
8. The method of claim 1 wherein said profiling step further comprises:
 - a) imaging said modulated groove with white light interferometry.
9. The method of claim 1 wherein said profiling step further comprises:
 - a) imaging said modulated groove with stylus profilometry.

10. The method of claim 1, wherein said surface is selected from the group consisting of acetates, glass, wax, paraffin, lacquer, shellac, varnish, vinyl, celluloids, metallic soaps, aluminum, copper, zinc, a metal, a metal alloy, and a thermoplastic.
11. The providing step of claim 1, wherein said modulated groove comprises:
 - a) a short transverse profile; and
 - b) a long longitudinal profile substantially orthogonal to said short transverse profile.
12. The method of claim 11 of said profiling step, wherein said profiling step short transverse profile further comprises:
 - a) a path modulation of said short transverse profile orthogonal to said long longitudinal profile.
13. The profiling step of claim 12, wherein said path modulation is in said tangent plane of said surface.
14. The profiling step of claim 12, wherein said path modulation is out of said tangent plane of said surface.
15. The method of claim 12, wherein said profiling step further comprises:
 - a) joining a plurality of short transverse profiles to form said metrological data set.
16. The method of claim 1, wherein said processing step further comprises:
 - a) piecewise approximating said metrological data set to model said modulated groove.
17. The method of claim 16, wherein said piecewise approximating step further comprises:
 - a) tracking a spatial location of said substantially constant profile portion in said groove to provide a tracked spatial location.
18. The method of claim 17, wherein said tracking step spatial location is determined by the metrological data representing one side of said groove.
19. The method of claim 17, wherein said tracking step spatial location is determined by the metrological data representing both sides of said groove.
20. The method of claim 17, wherein said tracking step spatial location is determined by the metrological data representing said bottom surface of said groove.
21. The method of claim 17, wherein said tracking step spatial location is determined by the metrological data representing the substantially constant profile portion of said groove.
22. The method of claim 17, wherein said processing step further comprises:
 - transforming said tracked spatial location into said audio extraction.

23. An audio reconstruction comprising:
 - a) said audio extraction of claim 1 stored on a computer readable medium or an audio medium.
24. The method of claim 17, wherein said tracking step further comprises:
 - a) interpolating said spatial location in said transverse profile portion to provide said tracked spatial location.
25. The method of claim 24 further comprising:
 - a) curve fitting said tracked spatial location for minimized error from said short transverse profile portion; and
 - b) transforming said tracked spatial location into said audio extraction.
26. An audio reconstruction comprising:
 - a) said audio extraction of claim 25 stored on a computer readable medium or an audio medium.
27. The method of claim 17, wherein said tracking step further comprises:
 - a) interpolating said spatial location in said longitudinal profile portion to provide said tracked spatial location.
28. The method of claim 27 further comprising:
 - a) curve fitting said tracked spatial location for minimized error from said short transverse profile portion; and
 - b) transforming said tracked spatial location into said audio extraction.
29. An audio reconstruction comprising:
 - a) said audio extraction of claim 28 stored on a computer readable medium or an audio medium.
30. A method for reconstructing a mechanical recording, comprising:
 - a) providing a mechanical recording comprising analog audio data;
 - b) a means for extracting metrological data from said analog audio data; and
 - c) a means for transforming said metrological data into an audio extraction of said mechanical recording.

31. A method of extracting an audio signal from a mechanical recording having a modulated groove on a surface, wherein said groove is formed by a modulated curvilinear longitudinal profile substantially orthogonal to a plurality of sequential transverse profiles from beginning to end of the groove, said longitudinal profile at each point in the transverse profile substantially tangent to said surface, each transverse section comprising two side surfaces and a bottom surface distanced from said surface, comprising:
- i) a means for profiling said mechanical recording to form a metrological data set comprising metrological data; and
 - ii) a means for processing said metrological data set by obtaining transverse profiles of said longitudinal profile representative of the modulated groove in three dimensions; and
 - iii) a means for further processing said metrological data set to reconstitute said audio signal defined by variations in the modulation of said modulated groove.